

WHAT IS CLAIMED:

1. An apparatus for monitoring a compressor, comprising:  
a plurality of sensor inputs for receiving input regarding operating parameters of a compressor;  
at least one control action output for sending a control action to said compressor; and  
a control member communicated with said plurality of sensor inputs and said control action output, said control member being adapted to analyze input from said plurality of sensor inputs, to determine a control action based upon said input and to send said control action to said at least one control action output.
2. The apparatus of claim 1, wherein said control member is adapted to receive input comprising compressor discharge pressure, compressor discharge temperature, compressor suction pressure, compressor suction temperature, oil pressure and a compressor on/off input signal.
3. The apparatus of claim 2, wherein said control member includes a memory storing a plurality of potential control actions, a plurality of adjustable operating parameters and a plurality of sensor input value combinations corresponding to said plurality of potential control actions, and a processor adapted to compare said input to said sensor input value combinations and select said control action from said plurality of control actions.
4. The apparatus of claim 3, wherein said plurality of potential control actions includes a compressor shut down command, operation parameter adjusting commands and commands for indicating that maintenance is needed.

5. The apparatus of claim 4, wherein said control member is further adapted to store information regarding at least one of sensor input values, said control action and maintenance alarms in said memory.

6. The apparatus of claim 3, further comprising a communication member associated with said control member and adapted to allow communication between said control member and a remote location.

7. The apparatus of claim 6, wherein said plurality of control actions includes a command to issue a signal through said communication member.

8. The apparatus of claim 1, further comprising a display member communicated with said control member, said control member being adapted to display a message on said display member corresponding to at least one of said input and said control action, and an indication of at least one compressor shut down or maintenance alarms; and to allow adjustment of at least one of said adjustable operating parameters.

9. The apparatus of claim 1, wherein said control member is adapted to identify a flooded start condition from said input.

10. The apparatus of claim 9, wherein said input includes suction temperature, suction pressure, discharge pressure, discharge temperature and oil pressure data, and said control actions include issuing a flooded start warning, altering an operating parameter of said compressor, shutting down said compressor, and combinations thereof.

11. The apparatus of claim 1, wherein said control member is adapted to identify a liquid slugging condition from said input.

12. The apparatus of claim 11, wherein said input includes suction temperature, suction pressure, discharge pressure, discharge temperature and oil pressure data, and said control actions include issuing a liquid slugging warning, altering an operating parameter of said compressor, shutting down said compressor, and combinations thereof.

13. The apparatus of claim 1, wherein said control member is adapted to compare discharge temperature from said input to a discharge temperature set point and to control a liquid injection valve on said compressor based upon results of the comparison.

14. The apparatus of claim 13, wherein said control member is adapted to open said liquid injection valve when said discharge temperature is greater than said set point.

15. The apparatus of claim 13, wherein said control member has a memory storing expected reactions to control actions taken on said liquid injection valve, and wherein said control member is adapted to compare actual change in said discharge temperatures to said expected reactions so as to identify a malfunctioning liquid injection valve.

16. The apparatus of claim 1, wherein said control member is adapted to identify a liquid floodback condition from said input.

17. A method for monitoring a compressor, comprising the steps of:

obtaining input regarding a plurality of compressor operating parameters;

feeding said input to a control member;

analyzing said input with said control member to determine a control action based upon said input; and

carrying out said control action on said compressor.

18. The method of claim 17, wherein said input comprises compressor discharge pressure, compressor discharge temperature, compressor suction pressure, compressor suction temperature, oil pressure and a compressor on/off input signal.

19. The method of claim 18, wherein said control member includes a memory storing a plurality of potential control actions and a plurality of sensor input value combinations corresponding to said plurality of potential control actions; and wherein said control member selects said control action from said plurality of potential control actions.

20. The method of claim 19, wherein said plurality of potential control actions include a compressor shut down command, operation parameter adjusting commands and commands for indicating that maintenance is needed.

21. The method of claim 19, further comprising the step of storing information regarding at least one of said input and said control action in said memory.

22. The method of claim 17, wherein said input is obtained from sensors positioned within about 1 foot of said compressor.

23. The method of claim 17, further comprising the steps of enabling communication of said control member with a remote location, and at least one of (a) sending information related to said control action to said remote location and (b) allowing access to information regarding said control action from said remote location.

24. In combination, a compressor and control module system, comprising:

a compressor; and

a control module comprising a plurality of sensor inputs for receiving input from said compressor; at least one control action output for conveying control actions to said compressor; and a control member communicated with said plurality of sensor inputs and said control action output, said control member being adapted to analyze input from said plurality of sensor inputs, to determine a control action based upon said input and to send said control action to said at least one control action output.

25. The system of claim 24, wherein said control member has a memory storing expected reactions to control actions taken on said liquid injection valve, and wherein said control member is adapted to compare actual change in said discharge temperatures to said expected reactions so as to identify a malfunctioning liquid injection valve.

26. The system of claim 24, further comprising a plurality of sensors associated with said compressor and connected to said sensor inputs.

27. The system of claim 24, wherein said plurality of sensors comprises sensors for measuring compressor discharge pressure, compressor discharge temperature, compressor suction

pressure, compressor suction temperature, oil pressure and compressor on/off input signal.

28. The system of claim 24, wherein said control member includes a memory storing a plurality of potential control actions and a plurality of sensor input combinations corresponding to said plurality of potential control actions.

29. The system of claim 28, wherein said plurality of potential control actions include a compressor shut down command, operation parameter adjusting commands and commands for indicating that maintenance is needed.

30. The system of claim 28, wherein said control member is further adapted to store information regarding at least one of said input and said control action in said memory.

31. The system of claim 24 further comprising a communication member associated with said control member and adapted to allow communication between said control member and a remote location.

32. The system of claim 31, wherein said at least one control action includes a command to issue a signal through said communication member.

33. The system of claim 24, further comprising a display member communicated with said control member, said control member being adapted to display a message on said display member corresponding to said control action.

34. The system of claim 33, wherein said message includes a value of at least one sensor input, status of at least one control output and an indication of at least one compressor shut down or maintenance alarm.